

more, this species agrees with all the other characters of the original description and with the parasitic habits mentioned in Fauna Suecica. This fact, together with the evidence in the Linnean collection, makes it certain that the species now known as *instigator* was previously described by Linnaeus as *compunctor*.

The synonymy is therefore:

***Ephialtes compunctor* (Linnaeus).**

Ichneumon compunctor Linnaeus, Nat. Syst. 10 Ed. 1758, p. 564, n. 31; Fauna Suec. 2 Ed., 1761, p. 403, n. 1609.

Ephialtes compunctor Schrank, Fauna Boica, vol. 2, pt. 3, 1802, p. 316.

Ichneumon instigator Fabricius, Ent. Syst., vol. 2, 1793, p. 164, no. 126.

Pimpla instigator Gravenhorst, Nov. acta acad. nat. Curios, vol. 9, 1818, p. 291; Morley, Brit. Ichneumons 1908, vol. 3, p. 92.

The species which has heretofore gone under the name *instigator* is a typical member of the genus *Pimplidea* Viereck (= *Pimpla* Authors), and the following generic synonymy is necessary.

***Ephialtes* Schrank 1802 (not Gravenhorst 1829).**

Syn. *Pimplidea* Viereck, 1914.

The Gravenhorstian genus *Ephialtes* (1829) is synonymous and isogenotypic with *Ichneumon* Linnaeus (1758) (See Viereck, Bul. 83, U. S. Nat. Mus., 1914), and must not be confused with *Ephialtes* Schrank which is much older.

DISTRICT OF COLUMBIA DIPTERA: TABANIDAE.¹

BY W. L. MCATEE AND W. R. WALTON.

On account of the biting proclivities of most members of the family, the Tabanidae, or horse-flies, are among the few groups of insects that are recognized by the general public. Wherever the biting species occur they are serious pests of wild mammals, domestic stock, and sometimes even of man. African Tabanidae transmit destructive diseases among mankind, but fortunately so far as known American species have assumed no such rôle.

Although the group is recognized by observers not versed in entomology, its richness in species usually is entirely unsuspected. Ordinary estimates place the number of deer flies at one, and of horse flies at two or three kinds. The facts are quite the

¹ For an account of the Syrphidae, see Proc. Biol. Soc. Wash. 29, 1916, pp. 173-203.

contrary, however, as the group is differentiated into a remarkably large number of species. The larvae of most of them live in water or wet soil, and the adults are found in greatest abundance in well-watered situations. In collecting them advantage is taken of certain characteristic habits. The collector himself attracts the blood-thirsty females of most species of deer flies (*Chrysops*) and of a few kinds of horse flies (*Tabanus*), and as they circle about his head they fall easy victims to the net. Deer flies at times are attracted to flowers, the males frequently, as is the case also with the species of *Pangonia*; hence, looking over flowers must not be omitted by the collector of species of this family. Their favorite flowers in this region so far as known, are chinquapin, *Ceanothus*, and dogbane.

Inspecting horses and cattle is naturally the most important method of finding horse-flies and it is good also for certain deer flies. Sometimes, numerous species are caught in a short time about farm stock. Horse-flies like to sun themselves on fences and poles; and often sit on roads, particularly about puddles. A few species are only obtained, and a number of others, may be caught, by sweeping vegetation about wet places. Most of the horse flies are active and alert and are strong fliers, so that their capture is by no means easy. In fact collecting them appeals to one as rather a sporting proposition with the odds generally in favor of the flies. On a hot summer day one frequently is reminded of his impotence by hearing the characteristic buzz of a horse-fly, which usually darts by so swiftly it is not seen, turns and goes off as rapidly as it came.

The returns for collecting Tabanidae are remarkable considering the large size of most of the species. It was surprising indeed to get a brand new genus in so well collected a vicinity as that of the District of Columbia. Some of the species are either rare, local, or very hard to obtain, as the paucity of records for them shows. Knowledge of these forms can be increased and probably numerous species can be added to our list by assiduous and intelligent collecting. We trust that publication of the list and especially of the keys will stimulate collectors to improve our knowledge of the Washington Tabanidae.

The total number of species in the list is 54. The standard of comparison of local lists, in the Eastern United States, is the New Jersey list of Professor C. W. Johnson.² It contains 74 species of Tabanidae. New Jersey has an unusual variety of environments suitable to horse flies, having the maritime, pine-barren, ordinary lowland and upland swamps, bogs, and watercourses, and so

² "The Insects of New Jersey," Ann. Rep., N. J. State Mus. 1909-1910, pp. 738-742.

uniform a region as that of the District of Columbia probably never will produce an equal number of Tabanid species. A tabulated comparison of the two faunas follows:

GENUS	NUMBER OF SPECIES NEW JERSEY	NUMBER OF SPECIES DISTRICT OF COLUMBIA
<i>Goniops</i>	1	1
<i>Pangonia</i>	2	2
<i>Chrysops</i>	33	19
<i>Neochrysops</i>	0	1
<i>Haematopota</i>	1	0
<i>Merycomyia</i>	0	1
<i>Tabanus</i>	38*	30
Totals.....	75*	54

* One name *exul*, is a synonym.

Haematopota punctulata, and an additional species of *Tabanus* namely *fuscopunctatus* have been taken at Chesapeake Beach, Md., and two additional species of *Chrysops* (*indus* and *mitis*) have been collected at Potomac Run, Va. All of these very possibly may yet be taken within the limits of the District fauna.

Special effort has been made by a number of local entomologists to collect the fauna of Plummers Island, Md., and vicinity. So far 21 species of Tabanidae have been taken on this 12-acre island, and 17 additional species in nearby parts of the Potomac River Valley. When the occurrence of species on Plummers Island is not stated in the text, it is indicated by the initials P. I. in parenthesis following the account of the species, and in the same way V. P. I. meaning vicinity of Plummers Island is added when necessary.

Key to Genera.

- A. Hind tibiae with 2 short but definite spines at tip.
 - B. Third joint of antenna with 8 divisions faintly indicated.
 - C. Wings distinctly divided into anterior colored and posterior hyaline portions; female pale sericeous, abdomen broad and obtuse.....*Goniops*
 - CC. Wings uniformly hyaline or smoky; body color darker, abdomen longer and more pointed.....*Pangonia*
 - BB. Third joint of antenna with 5 divisions.

- D. Abdomen inflated, much wider than thorax; eye-marking consisting of 4 coalescent, more or less diamond-shaped spots.....*Neochrysops*
W. R. Walton, new genus.
- DD. Abdomen not inflated; eye-marking different.....*Chrysops*
- AA. Hind tibiae without definite apical spines.
 - E. Ocelli distinct.....*Merycomyia*
 - EE. Ocelli absent.....*Tabanus*

Goniops Aldrich.

G. chrysocoma Osten Sacken.—All of the specimens thus far taken have been collected on Plummers Island, Md., or within a mile and a fraction of that locality. The females are rather easily found, when the collector once becomes acquainted with the peculiar rattling noise they make when disturbed at their egg-laying or brooding on the underside of leaves. The dates for Plummer's Island are from June 18 to July 21. Males, which are harder to get, were collected June 28, 1908, E. A. Schwarz and July 14, 1907, A. K. Fisher. Along Dead Run, Va., a nearby locality, the species has been taken June 23, Nathan Banks; June 30, 1916; July 11, 1915, R. C. Shannon, and July, 1911, a male, Wm. Palmer. A female in the National Collection was bred from a larva collected near Cabin John Bridge, Md., April 13, 1899. For an illustrated account of the life-history of this species see Proc. Ent. Soc. Wash. 13, 1911, pp. 21-29.

Pangonia Latreille.

Key to the Species.

- A. General color yellowish; antennae light reddish or yellow.....*pigra*
- AA. General color brownish; antennae dark.....*rasa*

P. pigra Osten Sacken.—Beltsville, Md., in copula on chinquapin flowers, June 18, 1916, Wal;cn; June 25, 1915, R. C. Shannon; July 4, 1912, McAtee; Falls Church, Va., on *Ceanothus* flowers, June 23; Glencarlyn, Va., on *Ceanothus*, June 28, Nathan Banks; Dalecarlia Reservoir, D. C., June 14, 1914, R. C. Shannon.

P. rasa Loew.—Lakeland, Md., caught by young *Phymata* on flowers of *Eupatorium purpureum*, August 14, 1910. F. Knab.

Neochrysops new genus, W. R. WALTON. (Fig. I.)

Hind tibiae bearing spurs; head very much as in *Chrysops* but antennae more slender as in fig. 1; first joint subequal with the third which is but faintly swollen at base and bears five annuli; second segment slender and two-thirds length of first. Eyes in life marked as in fig. 2. Ocelli present, closely approximated; wings evenly infuscated throughout; anterior branch

of third vein bearing a stump at its bend extending into second marginal cell as in fig. 3; abdomen globose, much wider than thorax, Figs. 4 and 5.

Neochrysops globosus, new species, W. R. Walton. Female: Face and front golden yellow, callosities shining pitchy black, a dark stain surrounds the ocelli; palpi yellow, proboscis black. Antennae; first joint yellow, second dark brown, third black, fading into brown at extreme base. Dorsum of thorax bearing three black subshining stripes on a golden yellow ground; the median black stripe extends half way across the scutellum

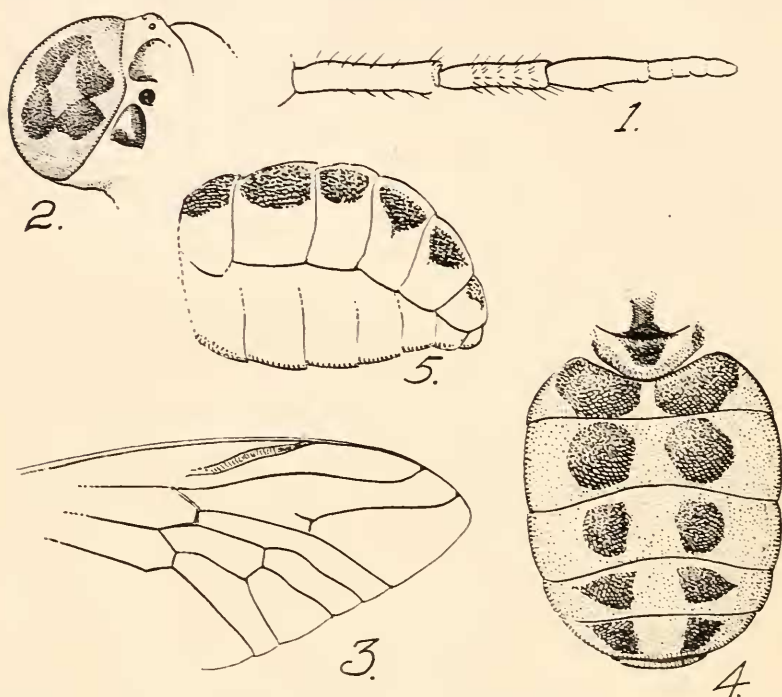


Fig. 1.—Structural details of *Neochrysops globosus* Walton, new genus and species.

which is also golden yellow. Abdomen fulvous, first to fifth segments inclusive each marked with a pair of black dots which decrease gradually in size toward tip of abdomen; venter immaculate fulvous. Legs in large part yellow, trochanters, tips of tibiae and tarsi black. Length 8 mm.

Described from a single female specimen deposited in the United States National Museum. This handsome species was collected by Mr. R. M. Fouts of the United States Bureau of Entomology at Cabin John Bridge, Maryland, July 20, 1916.

Some hesitancy is felt in proposing a new genus for the reception of this form because of its evidently strong affinities with *Chrysops*, but it differs so markedly in habitus from any species of *Chrysops* known to the author, that it seems inadvisable to include it therein, especially as the form possesses structural characters by which it may be distinguished from *Chrysops*.

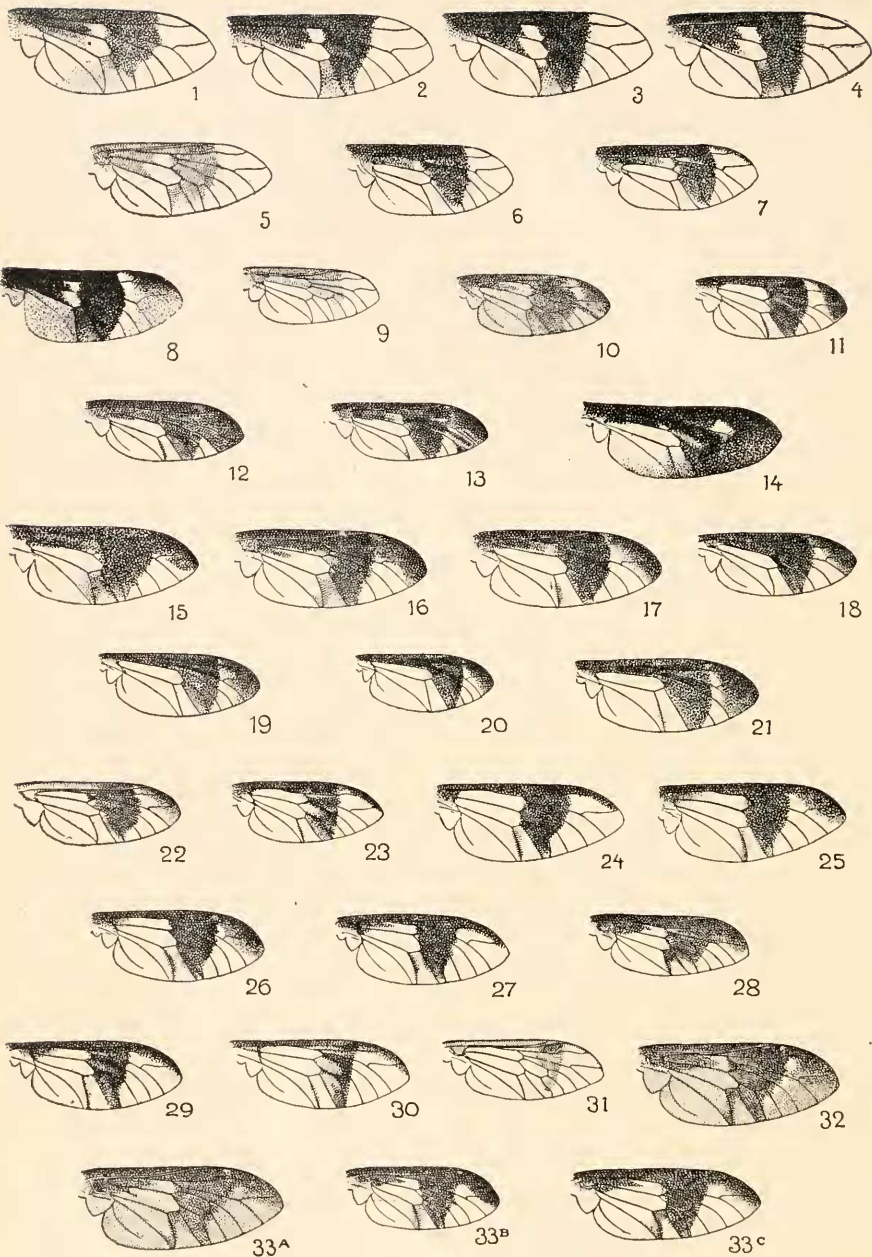
Chrysops Meigen.

These are the so-called deer-, sheep-, or pine-flies. They are black or black and yellow flies, usually with conspicuously marked wings. They frequent at least partially shaded situations and most of them swarm about moving warm-blooded animals, seeking an opportunity to bite. In the case of man, at least, they usually desert their intended victim when he comes to rest.

*Key to the Species.*³

- A. Abdomen mostly dark.
 - B. Wing with more or less distinct dark markings.
 - C. Apex of wing beyond crossband more or less distinctly infuscated especially bordering costal margin.
 - D. Apical spot consisting of a linear band along costal margin, barely extending into second submarginal cell, hyaline triangle extending broadly across first submarginal cell *brimleyi*
 - DD. Apical spot occupying at least four-fifths of second submarginal cell.
 - E. Abdomen immaculate; length about 8 mm. *parrulus*
 - EE. Abdomen with one or more yellowish stripes.
 - F. Hyaline triangle barely extending to the first submarginal cell. *univittatus*
 - FF. Hyaline triangle extending nearly to costal margin.
 - G. Apical spot encroaching on first posterior cell; hyaline triangle semilunate. Abdomen dark brown bearing 3 obscure yellowish stripes in the variety *morosus*, one in the typical form. *lugens*
 - GG. Apical spot not touching first posterior cell; hyaline triangle wider. Abdomen with a single median yellow stripe. *obsoletus*

³ The key includes *C. indus* and *C. mitis* which have been collected at Potomac Run, Va. and which may occur in this fauna.



EXPLANATION OF PLATE 10

*Published by courtesy of Entomological News and the Author,
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'07, Vol. XVIII pp. 139-146.*

WING PICTURES OF CHRYSOPS.

1, excitans	13, univittatus	25, dimmocki
2, celer	14, bistellatus	26, montanus
3, carbonarius	15, indus	27, sackeni
4, mitis	16, vittatus	28, frigidus
5, euclux	17, striatus	29, pudicus
6, niger	18, sequax	30, cursim
7, brimleyi	19, lugens	31, fulvistigma
8, amazon	20, parvulus	32, brunneus
9, nigribimbo	21, hinei	33a, flavidus
10, plangens	22, obsoletus	33b, flavidus
11, fallax	23, delicatulus	33c, flavidus
12, moechus	24, callidus	

CC. Apex of wing beyond crossband entirely hyaline.

H. Second basal cell entirely hyaline.....*niger*

HH. Second basal cell infuscated for at least half its length.

I. Abdomen with grayish yellow spots at sides of segments 1-2; wing markings light brown.....*euclux*

II. Abdomen and wings not so marked.

J. Fifth posterior cell with a small circular hyaline spot at base.....*carbonarius*

JJ. Fifth posterior cell without such spot.

K. Thorax with conspicuous lateral tufts of orange pile.....*celer*

KK. Thorax without such tufts.....*mitis*

BB. Wing entirely hyaline.....*vitripennis*

AA. Abdomen mostly yellowish, with dark markings.

L. Body markings strongly contrasting, wing picture pronounced.

M. Dark markings on second segment distinctly convergent or united, thus becoming inverted u-shaped, those on third to last segments tending to be transverse and usually enclosing a median series of more or less triangular areas.

N. First basal cell in large part hyaline.

O. Infuscation of wing beyond crossband confined to a narrow band along costal margin; abdominal triangles large.....*callidus*

- OO. Infuscation beyond crossband spread over a large part of first and second submarginal cells.
- P. Hyaline triangle extending almost to costal margin.....*fallax*
- PP. Hyaline triangle broadly separated from costal margin.
- Q. Yellow triangles on segments 2-4...*montanus*
- QQ. Yellow triangle only on segment 2; remaining segments black with narrow yellow hind margins.....*dimmocki*
- NN. First basal cell almost entirely infuscated; infuscation beyond crossband almost entirely filling out first submarginal cell.....*indus*
- MM. Dark markings of abdomen consisting of 2 or more series of longitudinal lines or dashes.
- R. Hyalin triangle extending beyond first posterior cell.
- S. Scutellum largely black or plumbeous in color.....*striatus*
- SS. Scutellum largely yellow or yellowish gray.
- T. Hyaline triangle extending through first submarginal cell, nearly to costa.....*sequax*
- TT. Hyaline triangle never extending more than halfway through first submarginal cell.....*vittatus*
- RR. Hyaline triangle not extending beyond first posterior cell.....*moechus*
- LL. Yellowish brown species, of faded appearance; wing picture dilute.
- U. Basal segment of antenna swollen; abdomen brown above with small yellow triangles.....*brunneus*
- UU. Basal segment of antenna not swollen; abdominal markings more contrasting.....*flavidus*

C. brimleyi Hine.—Beltsville, Md., May 28, 1916; Four-mile Run below Cowden, Va., female on flowers of *Apocynum medium*, June 11, 1916; Virginia near Plummers Island, Md., May 8, 1915, McAtce; Falls Church, Va., May 18, 1913, C. T. Greene.

C. callidus Osten Sacken.—Common; extreme dates June 4 and July 13; on June 11, 1916, a male was taken on *Apocynum* flowers along with specimens of the former species, McAtce; the female has been taken on flowers of *Ceanothus*, Nathan Banks. (V. P. I.)

C. carbonarius Walker.—Common; season, May 28 to July 14; a male was taken on chinquapin flowers, at Falls Church, Va., May 30 by Nathan Banks, and females by C. T. Greene, June 12. (V. P. I.)

C. celer Osten Sacken.—Common; extreme dates of collection, May 22 and July 1. (V. P. I.)

C. cuclux Whitney.—Beltsville, Md., May 28, 1916 McAtee; June 17, 1917, Walton; Branchville to Beltsville, June 4, 1914, L. O. Jackson.

C. dimmocki Hine.—Great Falls, Va., July 10, Wm. Palmer; Riverdale, Md., June 15, 1916, F. R. Cole.

C. fallax Osten Sacken.—Common; season, June 9 to July 17. Males have been taken at Falls Church, Va., June 9 and 19, and both sexes on flowers of *Ceanothus*, Nathan Banks. A female was captured at light, July 10, 1912, on Plummers Island, Md., by E. A. Schwarz and H. S. Barber.

C. brunneus Hine.—New Alexandria, Va., July 1907, Wm. Palmer; another at Falls Church, Va., no date, Nathan Banks.

C. lugens Wiedemann.—Abundant; extreme dates of collection June 3 and August 5. A female was taken on *Ceanothus* flowers, at Dead Run, Va., June 18, 1914, R. C. Shannon. (P. I.)

C. moechus Osten Sacken.—Abundant; season May 22 to August 25. Males were collected at Great Falls, Va., May 22, June 5, 19 and 21, Nathan Banks; June 11, 1910, Wm. T. Davis; and one was taken at light on Plummers Island, Md., June 8, 1914, E. A. Schwarz and H. S. Barber.

C. montanus Osten Sacken.—Chain Bridge, Va., June 14, S. A. Rohwer; Washington, D. C., June 7, 1900, June 9, 1899, and another specimen without date.

C. niger Macquart.—Very abundant; extreme dates, May 14 and July 7. The female has been taken on chinquapin flowers, Falls Church, Va., June 2 and on *Ceanothus* June 16, Nathan Banks; June 12, C. T. Greene; both sexes were collected on flowers of *Apocynum medium*, along Four-mile Run, below Cowden, Va., June 11, 1916, McAtee. (P. I.)

C. obsoletus Wiedemann.—Mt. Vernon, Va., July 13, 1917, McAtee; Falls Church, Va., July 12, female at honey dew on tulip tree, Nathan Banks; Vietch, Va., July 18, 1915; Four-mile Run, Va., August 7, 1910, F. Knab; Eastern Branch near Benning, D. C., August 29, 1915; Washington, D. C., July 7, 1899, J. S. Hine; July 5, August 19, 1911; Hyattsville, Md., July 18, 1909, F. Knab; July 4, 1899, J. S. Hine, Lakeland, Md., July 5, 1909, F. Knab; Plummers Island, June 28, 1914, McAtee.

C. parvulus Daecke.—Dead Run, Va., June 23, Nathan Banks; Beltsville, Md., June 18, 1916, McAtee, July 4, 1916, McAtee, Walton; July 6 and 14, 1916, F. R. Cole; July 13, 1912, McAtee.

C. sequax Williston.—Maryland near Plummers Island, August 22, 1916, McAtee; Marlboro, Md., June 19, 1916, R. C. Shannon; Falls Church, Va., male August 2, Nathan Banks; August 12, 1912, C. T. Greene; Washington, D. C., August 19, 1911, F. Knab.

C. striatus Osten Sacken.—Great Falls, Va., June 27, 1909, F. Knab.

C. univittatus Macquart.—Very abundant; season, May 31 to August 10. Males taken at Falls Church, Va., June 19 (on *Ceanothus*), and July 23; at the same locality also a female on chinquapin flowers, May 30, and another, at honey dew on tulip tree, July 12, Nathan Banks. (P. I.)

C. vittatus Wiedemann.—Very abundant; extreme dates, June 4 and September 10, thus being taken later in the fall than any other *Chrysops*. (P. I.)

C. vitripennis Shannon.—Originally described from Beltsville, Md. Taken there June 9, 1915, Nathan Banks; June 18, 1916, McAtee; June 25, 1916, R. C. Shannon; July 6, 1916, F. R. Cole. This species inhabits the peculiar Powdermill bogs, and seems to spend all its time on grass and other vegetation only a few inches above the water surface. Its flight is slow and feeble, and its whole behavior differs widely from that of all the other local species of the genus.

Merycomyia Hine.

M. whitneyi Johnson.

Tabanus whitneyi Johnson, C. W., Psyche, Vol. 11, pp. 15-16, Feb. 1904; [Wellesley, Mass., N. Y.].

Merycomyia geminata Hine, J. S., Ohio Naturalist, Vol. 12, No. 7, May 1912, pp. 515-516.

A single female of this interesting species was collected at Dyke, Va., July 16, 1916, McAtee.

Tabanus Linnaeus.

These are the horse-flies—all but 2 species of which are vigorous, swift-flying, robust insects. *T. bicolor* and *T. flavus* are soft-bodied and weak-winged compared to the others, and they are crepuscular in habit. Only one of our species habitually attacks man, namely *T. pumilus*. *T. costalis*, *T. nigrovittatus*, and *T. lineola* share this habit to some extent, joined occasionally by the larger species, as *T. sulcifrons*.

Key to the Species.

- A. Body almost entirely yellowish; wings weak, hyaline, with yellowish costa; unusually soft, feeble species.
- B. Anterior branch of 3rd vein ending in a free stump, joined to posterior branch by a short cross-vein; all cross-veins dark clouded.....*flavus*

- BB. Anterior and posterior branches of 3rd vein joining in a fork; cross veins not dark clouded.....*bicolor*
- AA. Body not chiefly yellowish; wings strong; robust species.
- C. First three segments of abdomen chiefly yellowish red, remainder black.....*cinctus*
- CC. Abdomen otherwise.
 - D. Abdomen without a median line of light spots or other longitudinally arranged pale markings.
 - E. Wings wholly blackish.....*atratus*
 - EE. Wings otherwise.
 - F. Wings dark brown at base, smoky apically, with dark spots at forks of 3rd and 4th veins.....*nigrescens*
 - FF. Wings smoky along costa, without dark spots.
 - G. Wings hyaline apically; abdominal segments with pale posterior margins.....*americanus*
 - GG. Wings brownish yellow; abdominal segments without pale margins.....*giganteus*
 - DD. Abdomen with longitudinally arranged pale markings.
 - H. The pale markings form or include a continuous central stripe the whole length of abdomen.
 - I. Costal cell hyaline; front of female distinctly convergent anteriorly.....*lineola*
 - II. Costal cell yellowish.
 - J. Flies 15 mm. or more in length, more robust.
 - K. Front narrow; upper angle of 3rd antennal joint prominent.....*fulvulus*
 - KK. Front broad; upper angle of 3rd antennal joint very low.....*sagax*
 - JJ. Flies usually 12 mm. or less in length, more slender.
 - L. Thorax gray; hind tibiae faintly brownish at tip; lateral rows of spots on abdomen usually faint.....*nigrovittatus*
 - LL. Thorax yellowish; hind tibiae distinctly black at tip; lateral rows of spots on abdomen usually conspicuous.....*costalis*
 - HH. The pale markings do not include such a stripe but consist of more or less separated triangles or spots.
 - M. The pale markings consist chiefly of a single median row of white triangles or spots.
 - N. Triangles only on segments 3 to 5.....*trimaculatus*
 - NN. Triangles or spots on all abdominal segments, though sometimes small on 1, 2 and 6.
 - O. Posterior margins of abdominal segments pale.
 - P. General color of abdomen reddish brown.

- Q. 3rd joint of antenna longer and more slender, basal process slightly falcate; antennae wholly pale; abdomen abruptly narrowed from base, dark reddish brown, somewhat shining, with narrow triangles.....*recedens*
- QQ. 3rd joint of antenna not so slender, basal process not falcate; basal joints and tip of third joint dark; abdomen not as above.
- R. Dividing line between coarse and fine facets of eye of male high, leaving an almost semicircular portion of eye below it; wings brownish at base and along veins, but the interior of cells grayish-white..*sulcifrons*
- RR. Dividing line not so high, portion of eye below it broadly sigmoid; wings similar to those of last species, but interior of cells not so whitish.
abdominalis
- PP. Abdomen blackish-brown or black.
- S. Triangles ending abruptly on 4th segment, never more than faintly indicated on 5th and 6th; thorax mostly black; wings blackish.....*trispilus*
- SS. Triangles on all abdominal segments.
- T. Triangles distinctly larger on segments 3 to 5, very small on 2; scutellum densely white pollinose...*molestus*
- TT. Triangle on segment 2 large.
- U. Tibiae chiefly gray, length over 15 mm.....*melanocerus*
- UU. Tibiae chiefly blackish, length under 15 mm....*coffeatus*
- OO. Posterior margins of abdominal segments not pale.
- V Thorax and scutellum chiefly livid gray; abdomen blackish; wings smoky...*superjumentarius*
- VV. Thorax, scutellum and abdomen brownish...*acteon*
- MM. The pale markings form 2 or 3 longitudinal rows of triangles or spots.
- W. Upper angle of 3rd antennal joint drawn out in a long process.....*hirticulatus*
- WW. Upper angle of 3rd antennal joint not so produced.

- X. Cross-veins at middle of wing, apex of discal cell, and furcation of 3rd vein distinctly dark clouded.
- Y. Abdomen blackish-brown with small faint median triangles and yellowish lateral spots, especially large on segments 1 to 3.....*lasiophthalmus*
- YY. Abdomen otherwise.
 - Z. Front broad, lower part of callosity squarish; triangles on abdomen not connected along posterior border of segments, not conspicuous.....*reinwardtii*
 - ZZ. Front narrow, lower part of callosity elliptical; triangles on abdomen very large, bright white, their bases touching across posterior borders of segments.....*cymatophorus*
- XX. These wing veins not dark clouded.
 - a. Face immediately above insertion of antennae denuded and shining.....*carolinensis*
 - aa. Face immediately above insertion of antennae pollinose
 - b. Central light markings of abdomen are large triangles, almost or quite reaching anterior margins of segments.
 - c. Third joint of antenna long slender, basal angulation prominent, acute and slightly falcate, brown except at tip; general color brownish..*longus*
 - cc. Third joint of antenna short, stout, basal angulation neither prominent, acute nor falcate.
 - d. Antennae black; tibiae gray; length about 16 mm.....*vivax*
 - dd. Antennae largely orange yellow; tibiae black; length about 12 mm.....*astutus*
 - bb. Central light markings of abdomen are merely shallow expansions of the narrow pale hind margins of segments.
 - c. Length, 12 mm. or more; eyes unmarked, *sparus*
 - cc. Length usually 10 mm. or less; eyes banded.....*pumilus*

T. acteon Osten Sacken.—Washington, D. C., August 14, 1917, at light, H. F. Wickham; Plummers Island, Md., August 31, 1907, McAtee; Beltsville, Md., September 10, 1916, both sexes, F. R. Cole, McAtee; August 22, 1917, C. T. Greene. The specimen collected on Plummers Island was one of a number taking part in a peculiar and very interesting performance. The flies poised about 20 feet above the ground in an opening that had been cut through

the trees in front of the house. Sometimes they remained stationary, again they shifted position rapidly; their most unusual feat, however, was darting over the roof of the cabin and back through the 2 open doors or vice-versa. So swiftly was this done that a fly would scarcely be missed from its place before it was back again. This behavior was seen during only a few days in late summer 1907, and has not again been observed. The Beltsville specimens found by McAtee were sitting on the road.

T. americanus Forster.—Laurel, Md., July 17, 1914, E. B. Marshall; Beltsville, Md., July 30, 1916, Walton. A specimen seen mashed on a porch floor at Dunn-Loring, Va., August 30, 1916, McAtee.

T. astutus Osten Sacken.—Beltsville, Md., June 18, 1916, McAtee; Chain Bridge, D. C., September 7, 1913, C. T. Greene.

T. atratus Fabricius.—Beltsville, Md., June 23, 1909, McAtee; July 14, 1916, F. R. Cole; October 1, 1916, McAtee; Woodridge, D. C., August 29, 1915, E. R. Kalmbach; Washington, D. C., June 11, Wm. Palmer; Corner Conduit and Potomac Roads, Md., June 29, 1913, McAtee; Plummers Island, Md., June 9, 1914, R. C. Shannon; Falls Church, Va., August 22, 1917, C. T. Greene; A species more often seen than captured; a male was seen at a mud puddle in road, at Mt. Vernon, Va., August 20, 1916, McAtee.

T. bicolor.—Wiedemann.—Washington, D. C., July 7, 1899, J. S. Hine; another specimen without date, M. L. Linell.

T. carolinensis Macquart.—Common; season May 9 (male, first female May 28) to July 18. (P. I.)

T. cinctus Fabricius.—Beltsville, Md., July 4, 1916, Walton; Laurel, Md., July 17, 1914, E. B. Marshall.

T. coffeatus Macquart.—Odenton, Md., July 4, 1913; Beltsville, Md., July 4, 1916, McAtee; July 6, 1916, (including 1 male), F. R. Cole, C. T. Greene; August 6, 1916, McAtee; Hyattsville, Md., male, June 19, 1915, B. P. Currie; Bladensburg, Md., July 17, 1916, R. C. Shannon; Maryland near Plummers Island, July 27 and August 22, 1916, McAtee; Great Falls, Va., June 5, Nathan Banks.

T. costalis Wiedemann.—Beltsville, Md., July 10, 1909, Branchville to Beltsville, Md., June 4, 1914, McAtee; Linnievill, Md., July 5, 1913, R. C. Shannon; Maryland near Plummers Island, July 11, 1909, July 27, 1916, McAtee; Washington, D. C., June 18, 1897, July 3 and 7, 1899, J. S. Hine; Maywood, Va., July 16, 1916, McAtee; Falls Church, Va., June 20, July 4, 25 (male) and 28, and August 5, male at honeydew on tulip tree, Nathan Banks; July 3, 1916; on *Ceanothus*, June 24, 1916, C. T. Greene.

Atylotus baal Townsend (see bibliography) is related to *costalis* or *fulvulus*, but its exact identity cannot be made out except by study of the type.

T. cymatophorus Osten Sacken.—A striking and handsome species for which there is only one record, Poolesville, Md., July, 1898, F. C. Pratt.

T. flavus Macquart.—We are at the northern edge of the range of this peculiar species (usually called *mexicanus* L.), and there is but a single record, namely, Garrett Park, Md., July 4, 1899, W. R. Maxon. Mr. Maxon says this specimen probably was swept from vegetation on low wet ground.

T. fulvulus Wiedemann.—Common; extreme dates of collection, May 20 (male, first female, June 11) to August 28. Males taken also in June, July, and August (16th). (P. I.)

T. giganteus DeGeer.—Beltsville, Md., July 30, 1916, Walton; Plummers Island, Md., August 27, 1905, McAtee; Falls Church, Va., August 27, 1912, C. T. Greene.

T. hirtiocularatus Macquart.—Branchville to Beltsville, Md., June 4, 1914, L. O. Jackson, McAtee; Beltsville, Md., July 4, 1916, Walton, July 9, 1916, McAtee; Cabin John Bridge, Md., July 1, 1916, R. M. Fouts, Plummers Island, Md., June 6, 1906, Va., near Plummers Island, June 19, 1909, McAtee; Dead Run, Va. June 19, 1915, R. C. Shannon; Great Falls, Va., June 27, 1909, Glencarlyn, Va., June 11, 1911, F. Knab; Falls Church, Va., May 27, 1916, J. N. Knull; Washington, D. C., June, 1898.

T. lasiophthalmus Macquart.—Branchville to Beltsville, Md., June 4, 1914; Beltsville, Md., May 28, 1916; McAtee; June 1, 1916, R. C. Shannon; June 18, 1916, McAtee; Plummers Island, Md., male at light, June 16, 1916, R. C. Shannon; Washington, D. C., May 23, G. E. Quinter; June 3, 1913, McAtee; Falls Church, Va., May 18, June 11, Nathan Banks.

T. lineola Fabricius.—Common; season May 18 to September 17; males taken, June 4 and 23 and September 3 on the last date, at light, Plummers Island, Md., H. S. Barber. (P. I.)

T. longus Osten Sacken.—Bethesda, Md., July 17, 1913, J. C. Crawford; Plummers Island, Md., August 19, 1906, McAtee; Rock Creek, D. C., August 3, 1913, R. C. Shannon.

T. melanocerus Wiedemann.—Beltsville, Md., June 18, 1916, D. C., Mabbott; July 6, 1916, C. T. Greene; July 14, 1916, F. R. Cole; July 26, 1918, Walton; August 6, 1916, August 21, 1917, McAtee; Falls Church, Va., male, June 13; female on flowers of *Ceanothus*, June 23; July 17, Nathan Banks; Mt. Vernon, Va., June 27, 1915, McAtee.

T. molestus Say.—Common; extreme dates of capture June 14 and August 11; a male taken June 25, 1915, Beltsville, Md., R. C. Shannon. (P. I.)

T. nigrescens Palisot de Beauvois.—Fairly common; season June 24 to August 24; males taken, July 6 and 28. (P. I.)

T. nigrovittatus Macquart.—Maryland near Plummers Island, July 11, 1909 and July 27, 1916; McAtee; Falls Church, Va., female on flowers of chinquapin, June 29, Nathan Banks; Four-mile Run, Va., male, May 31, 1914; McAtee. Said to be distinct from *costalis* in the maritime part of its range; here it is but feebly differentiated.

T. pumilus Macquart.—Very abundant; extreme dates of collection May 30 and August 21; males taken July 2 and 6. Hovers about the head like a *Chrysops*. (P. I.)

T. recedens Walker.—Branchville to Beltsville, Md., June 4, 1914, McAtee; Beltsville, Md., June 23, 1917, C. T. Greene.

T. reinwardtii Wiedemann.—Maryland near Plummers Island, July 27, 1916, McAtee; a very neatly colored species.

T. sagax Osten Sacken.—Beltsville, Md., June 18 and August 6, 1916; Maryland near Plummers Island, July 27, McAtee.

T. sparus Whitney.—Beltsville, Md., June 18, 1916, McAtee, identified by Jas. S. Hine; Maryland near Plummers Island, June 29, 1913, J. D. Hood; Eastern Branch, D. C., May 30, H. S. Barber.

T. sulcifrons Macquart.—Abundant, extreme dates of collection June 28 and October 1; males taken July 6, 7, 13, 20, 26 and August 10, 20, and 26. (P. I.)

Osten Sacken predicated *T. abdominalis* upon specimens with closed first posterior cell.⁴ This is an adventitious character and due to giving it great weight, his conception of the species probably is faulty. Apparently we have two species or perhaps subspecies of this group, separable on the relative extent of the coarse and fine facets of the eyes of the males. Neither original description of *abdominalis* or *sulfifrons* mentions the males. The descriptions of the females are so alike that it is little wonder Osten Sacken seized avidly on the supposedly definite character of closed cell (which was mentioned only incidentally by another than the original describer.)

It seems wise, however, for the reason mentioned above, to place no reliance on this character. This procedure renders the name *exul* O. S. unnecessary. Since there is no appreciable difference in the original descriptions of *abdominalis* and *sulfifrons*, it seems base to base these forms on the character of the eyes in the males as pointed out by Osten Sacken. In *T. sulfifrons* the dividing line between the fine and coarse facets of the eyes lies much higher than in *T. abdominalis*, at about the middle of the height of the head. The portion of the eye below the line

⁴ Osten, Sacken, C. R. Prodrôme of a Monograph of the Tabanidae of the United States. Part II, The genus *Tabanus*. Mem. Bost. Soc. Nat. Hist. II, pp. 434-436, 1876.

forms almost a semicircle. In *T. abdominalis*, however, (as designated by Osten Sacken) this dividing line lies below the middle of height of head and the portion of a single eye below it is broadly sigmoid in outline.

Indications of intergrading occur, however, in this otherwise satisfactory structural character. The appearance of females collected with males of the two forms certainly suggests that the two will eventually be found to be fully connected by intergrades. The only difference at all apparent between two series of females is the more pronounced whitish appearance of the wing membrane, and less brownish suffusion along costa and veins in *sulcifrons* (as here separated).

T. superjumentarius Whitney.—Beltsville, Md., June 18 and July 4, 1916, July 10, 1909, McAtee; Chain Bridge, Va., July 19, 1916, T. E. Snyder; Falls Church, Va., July 1, 1914, Wm. Middleton.

T. trimaculatus Palisot de Beauvois.—Odenton, Md., July 4, 1913, Beltsville, Md., June 18, 1916, July 10, 1909, McAtee; Maryland near Plummers Island, July, 1907, Wm. Palmer; Plummers Island, Md., male, July 2, 1907, H. S. Barber; July 21, 1907, A. K. Fisher; Washington, D. C., male June 23, 1898, no collector given; June 24, 1906, McAtee; Great Falls, Va., June 12; Falls Church, Va., June 10 and 24, Nathan Banks.

T. trispilus Wiedemann.—Odenton, Md., July 4, 1913, McAtee; Beltsville, Md., male, June 25, 1915, R. C. Shannon; July 4, 1916, Walton, McAtee; July 16, 1916, Walton; Bladensburg, Md., June 23, 1916, R. C. Shannon; Maryland near Plummers Island, July 2, 1916, A. K. Fisher; Virginia near Plummers Island; Md., June 15, 1908, McAtee; Falls Church, Va., male on flowers of chinquaqin June 10, 1913, C. T. Greene; female on flowers of *Ceanothus*, June 14, Nathan Banks; Glencarlyn, Va., June 26, 1910, male on *Ceanothus* flowers, F. Knab.

T. variegatus Fabricius.—This species, which is related to *abdominalis* and *sulcifrons*, is not well understood and as noted in the discussion of *sulcifrons* the names for this group are confused. A thorough overhauling of this section of the genus is needed. *T. variegatus* is recorded from the District of Columbia by Osten Sacken. (See Bibliography.)

T. vivax Osten Sacken.—Beltsville, Md., August 8, 1915, Maryland near Plummers Island, July 2, 1916; Scotts Run, Va., July 25, 1915, McAtee; Falls Church, Va., July 3, 1916, J. N. Knull.

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 Five species recorded, one being *T. variegatus* Fabr., for which we have no other record.
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 Gives local records for two species of *Chrysops*, and two of *Tabanus*, besides *Atylotus baal* which is described as new.

A NEW COLLETID BEE FROM ECUADOR.

BY T. D. A. COCKERELL.

Colletes rohweri, new species.

Male.—Length about 8 mm., anterior wing 5.8 mm.; black, the head and thorax with long hair; head broader than long; malar space square; mandibles chestnut-red apically; labrum with two obtuse ribs; clypeus with